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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Michael H. Myers

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EXAMINER

LEUNG, CHRISTINA Y

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/922,096

Applicant(s)

MYERS ET AL.

Examiner

Christina Y. Leung

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☒ Claim(s) 3 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 3 and 20 are objected to because of the following informalities:

Claim 3 recites "the circulator further configured to circulate the second reflected photonic signal to provide the *first* narrowband photonic signal" in lines 12-13 of the claim (emphasis added). Examiner respectfully suggests that Applicants amend "first" to "second," since although the circulator also provides a first narrowband signal, the second reflected signal is circulated to provide the *second* narrowband photonic signal. Examiner notes that Applicants' claim 14 recites similarly directed limitations but (properly) recites that the second reflected signal provides the second narrowband signal in the last lines of that claim.

Further regarding claim 3, the last line of claim 3 (line 13) ends with the word "and"; Examiner respectfully suggests that Applicants amend the claim so that it has a definite ending.

Regarding claim 20, line 6 of claim 20 ends with a period ("."), but the claim appears to recite additional limitations in lines 7 and 8. Examiner respectfully suggests that Applicants amend the claim so that all limitations are properly incorporated into the claim.

Appropriate correction is required.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

Art Unit: 2633

F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 6-11, 17, and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 13-17, 21, and 22 of U.S. Patent No. US 6,407,846 B1 in view of Tomioka (US 5,452,115 A).

Claim 17 of the instant application recites:

17. The method of claim 15, wherein wavelength shifting comprises:
providing a photonic signal;
providing a modulation waveform;
modulating the photonic signal with the modulation waveform, thereby providing a shifted photonic signal;
providing a wavelength reference;
comparing the wavelength reference with the shifted photonic signal to provide a wavelength error signal; and
adjusting the modulation waveform in proportion to the wavelength error signal, thereby correcting wavelength errors in the first shifted photonic signal.

Claim 1 of US 6,407,846 B1 recites:

1. A method for providing a wavelength shifted and stabilized photonic signal, the method comprising:
providing a photonic input signal comprising at least one channel, each channel having a wavelength that is definable as a function of time;

Art Unit: 2633

providing a modulation waveform configured to shift the wavelength of the photonic input signal;

modulating the photonic input signal with the modulation waveform to shift the wavelength of each channel of the photonic input signal, thereby providing a photonic output signal comprising at least one channel, each channel having a wavelength that is definable as a function of time;

providing a wavelength reference;

comparing the wavelength reference with at least one channel of the photonic output signal to thereby providing an error signal configured to correct the wavelength of at least one channel of the photonic output signal;

adjusting the modulation waveform in accordance with the error signal; and

modulating the photonic input signal with the modulation waveform to correct the wavelength of the photonic output signal.

Although the language of the claims differ slightly, Examiner respectfully notes that the claims recite similar limitations and steps regarding a method for wavelength shifting, including modulating a photonic input signal with a modulation waveform to shift the photonic signal; comparing a wavelength reference to the resulting shifted photonic signal to provide an error signal; and adjusting the modulation waveform in accordance with the error signal to correct the wavelength of the shifted photonic signal.

Claim 17 of the instant application further depends on claims 12 and 15 of the instant application and therefore further includes the following limitations regarding a larger system that includes the above-mentioned wavelength shifting:

12. A method for wavelength-shift multiplexing comprising:

providing a first photonic signal;

narrowband filtering the first photonic signal, thereby providing a first narrowband photonic signal; and

wavelength shifting the first narrowband photonic signal, thereby providing a first shifted photonic signal.

15. The method of claim 12, further comprising providing a shift signal and wavelength shifting the first narrowband photonic signal in proportion to the shift signal.

Art Unit: 2633

Since claim 1 of US 6,407,846 B1 also includes providing a photonic signal and a shift signal as recited in claims 12, 15, and 17 the instant application, claim 17 of the instant application mainly differs from claim 1 of US 6,407, 846 B1 in that claim 17 includes narrowband filtering the photonic signal prior to the wavelength shifting step.

However, Tomioka teaches filtering a photonic signal in order to select a particular signal before its wavelength is shifted (Figure 20 shows tunable filters 62 and wavelength converters/shifters 63; column 21, lines 26-32). It would have been obvious to a person of ordinary skill in the art to include filtering as taught by Tomioka in the method recited in claim 1 of US 6,407,846 B1 in order to remove extraneous signals and effectively provide a single wavelength signal for the wavelength shifting step.

Claim 18 of the instant application depends on claim 17 and recites a selection of limitations that correspond to any one of claims 12, 13, 14, 18, and 19 of US 6,407,846 B1. Claim 18 is therefore also rejected as being unpatentable over those claims of U.S. Patent No. 6,407,846 B1 in view of Tomioka

Claim 6 of the instant application recites:

6. The apparatus of claim 1, wherein the wavelength shifter comprises:
a photonic input path configured to carry a photonic input signal comprising an input channel, having an input wavelength definable as a function of time;
a photonic output path configured to carry a photonic output signal comprising an output channel, having an output wavelength definable as a function of time;
a modulation device configured to modulate the photonic input signal in accordance with a modulation waveform to provide the photonic output signal;
a modulation synthesizer configured to provide the modulation waveform to the modulation device effective to shift the input wavelength to the output wavelength;
a wavelength error detector configured to detect errors in the output wavelength and to provide to the modulation synthesizer an error signal configured to correct the output wavelength.

Art Unit: 2633

Examiner notes that the apparatus recited in claim 6 also generally implements the method steps recited in claim 1 of US 6,407,846 B1; given the method steps already recited by claim 1 of US 6,407,846 B1, it would have been obvious to provide an apparatus such as recited in claim 6 in order to implement the method.

Claim 6 further includes the limitations of claim 1:

An apparatus for wavelength-shift multiplexing, the apparatus comprising:
a first photonic path configured to carry a first photonic signal;
a narrowband filter configured to bandpass filter the first photonic signal to provide a first narrowband photonic signal;
a wavelength shifter configured to wavelength shift the first narrowband photonic signal to provide a first shifted photonic signal; and
a second photonic path configured to carry the first shifted photonic signal.

Examiner notes that claim 6 of the instant application mainly differs from claim 1 of US 6,407,846 B1 in that claim 6 again includes a narrowband filter. However, Tomioka teaches filtering a photonic signal in order to select a particular signal before its wavelength is shifted (Figure 20 shows tunable filters 62 and wavelength converters/shifters 63; column 21, lines 26-32). It would have been obvious to a person of ordinary skill in the art to include filtering as taught by Tomioka in the method recited in claim 1 of US 6,407,846 B1 in order to remove extraneous signals and effectively provide a single wavelength signal for the wavelength shifting step. Therefore, claim 6 is also rejected as being unpatentable over claim 1 of U.S. Patent No. 6,407,846 B1 in view of Tomioka.

Claims 7-11 of the instant application depend on claim 6 and recites limitations that correspond to claims 13, 14, 16-19, 21, and 22 of US 6,407,846 B1. Claims 7-11 are therefore also rejected as being unpatentable over those claims of U.S. Patent No. 6,407,846 B1 in view of Tomioka

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Examiner has already objected to claim 20 for including a period (".") in what appears to be the middle of the claim. Examiner further notes that the claim appears to recite the limitation "sawtooth in shape" in the last line of the claim. It is unclear from the claim what element is "sawtooth in shape." Examiner notes that Applicants' specification discloses a modulation waveform that may be a sawtooth shape, but the specification does not specifically disclose that a shifted photonic signal, such as recited in claim 20, may be a sawtooth shape.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 12, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomioka (US 5,452,115 A).

Regarding claim 1, Tomioka discloses an apparatus for wavelength-shift multiplexing (Figure 20), the apparatus comprising:

a first photonic path configured to carry a first photonic signal (i.e., the input to filter 62);

Art Unit: 2633

a narrowband filter 62 configured to bandpass filter the first photonic signal to provide a first narrowband photonic signal;

a wavelength shifter 63 configured to wavelength shift the first narrowband photonic signal to provide a first shifted photonic signal (column 21, lines 26-32); and

a second photonic path configured to carry the first shifted photonic signal (i.e., the output from shifter 63).

Regarding claim 12, Tomioka discloses a method for wavelength-shift multiplexing (Figure 20) comprising:

providing a first photonic signal;

narrowband filtering the first photonic signal (using filter 62), thereby providing a first narrowband photonic signal; and

wavelength shifting the first narrowband photonic signal (using wavelength converter 63), thereby providing a first shifted photonic signal (column 21, lines 26-32).

Regarding claim 19, Tomioka discloses an apparatus for wavelength-shift multiplexing (Figure 20), the apparatus comprising:

a plurality of photonic signal paths (i.e., the plurality of input to the plurality of filters 62), each photonic signal path thereof configured to carry a photonic input signal comprising a selected narrowband signal;

a plurality of photonic transceivers (filters 62 and converters 63), each photonic transceiver thereof configured to extract and wavelength shift the selected narrowband signal, thereby providing a plurality of channelized photonic signals;

Art Unit: 2633

a combiner-splitter (coupler 64) configured to combine the plurality of channelized photonic signals, thereby providing a multiplexed photonic output signal; and

a multiplexed photonic signal path configured to carry the multiplexed photonic output signal (i.e., the output of coupler 64).

Regarding claim 20, as well as it may be understood with regard to 35 U.S.C. 112 discussed above, Tomioka further discloses that each photonic transceiver comprises:

a first photonic path configured to carry a first photonic signal (i.e., the input of one of filters 62);

a narrowband filter (one of filters 62) configured to bandpass filter the first photonic signal to provide a first narrowband photonic signal;

a wavelength shifter (one of converters 63) configured to wavelength shift the first narrowband photonic signal to provide a first shifted photonic signal; and

a second photonic path configured to carry the first shifted photonic signal (i.e., the output of converter 63).

8. Claims 2, 3, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomioka in view of Gaubatz (US 6,704,517 B1) in view of Oikawa (US 6,252,698 B1).

Regarding claims 2 and 13, Tomioka discloses an apparatus and method for wavelength-shift multiplexing as discussed above with regard to claims 1 and 12 respectively. Tomioka does not specifically disclose that the second photonic path may carry a second photonic signal (i.e., in the same direction as the first photonic signal), Tomioka does not specifically disclose that that the wavelength shifter may shift the second signal and that the filter may further filter the second signal in that order (or in other words, Tomioka does not specifically disclose that a

Art Unit: 2633

second signal may be processed by the shifter and filter in a direction opposite from the first signal as recited in the claim).

However, bidirectional communications are generally well known in the art, and Tomioka already discloses that the optical system that includes the filter and shifter shown in Figure 20 is configured to provide bidirectional communications (Figures 16-18; column 21, lines 9-32). In other words, Tomioka discloses filtering and shifting signals in both directions but does not specifically disclose that the filtering and shifting functions may be performed in both directions by the same elements.

However, filtering and shifting elements that are operational in two directions are also known in the art, Gaubatz teaches a bidirectional filter element (Figure 8; column 5, lines 45-54), and Oikawa teaches a bidirectional wavelength shifting element (Figure 6; column 13, lines 61-67; column 14, lines 1-24). It would have been obvious to a person of ordinary skill in the art to use the bidirectional filtering and shifting elements as taught by Gaubatz and Oikawa in the system disclosed by Tomioka in order to implement the bidirectional system already disclosed by Tomioka more efficiently, i.e. without duplication of hardware on two separate paths.

Regarding claims 3 and 14, as well as claim 3 may be understood with regard to the claim objection discussed above, Tomioka discloses a filter but does not specifically disclose a bidirectional filter as discussed above with regard to claims 2 and 13. Tomioka also does not specifically disclose a filter including a circulator and reflecting filter. However, the filter taught by Gaubatz (Figure 8) further comprises:

a circulator Z4 configured to circulate the first photonic signal S1 and provide a first circulated photonic signal;

a reflecting filter (filtering element F5 and reflector R) configured to selectively reflect the first circulated photonic signal to provide a first reflected photonic signal;

the circulator further configured to circulate the first reflected photonic signal to provide the first narrowband photonic signal SK1;

the circulator further configured to circulate the second unshifted photonic signal S2 to provide a second circulated photonic signal;

the reflecting filter (again, elements F5 and R) configured to selectively reflect the second circulated photonic signal to provide the second reflected photonic signal;

the circulator further configured to circulate the second reflected photonic signal to provide the second narrowband photonic signal SK2 (column 5, lines 45-54).

Again, it would have been obvious to a person of ordinary skill in the art to use the bidirectional filtering element including a circulator and reflecting filter as taught by Gaubatz in the system suggested by Tomioka in view of Gaubatz and Oikawa in order to implement the bidirectional system already disclosed by Tomioka more efficiently, i.e. without duplication of hardware on two separate paths.

9. Claims 4, 5, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomioka in view of Oikawa.

Regarding claims 4 and 12, Tomioka discloses an apparatus and method for wavelength-shift multiplexing as discussed above with regard to claims 1 and 12 respectively. Tomioka does not specifically disclose that the wavelength shifter receives a shift signal. However, Oikawa teaches a wavelength shifter (Figure 6) related to the one disclosed by Tomioka that receives a shift signal (shown as λ_1 in Figure 6). Regarding claims 5 and 13 in particular, Oikawa further

teaches that the shift signal may be characterized by a "range" of allowable wavelength shifts, since the shift signal they disclose dictates the desired output wavelength (column 13, lines 61-67; column 14, lines 1-24).

Regarding claims 4, 5, 15, and 16, it would have been obvious to a person of ordinary skill in the art to include a shift signal as taught by Oikawa in the system and method disclosed by Tomioka et al. in order to properly control the shifting element to convert the wavelength to a particular desired different wavelength.

Allowable Subject Matter

10. Claims 6-11 and 17-18 contain allowable subject matter. However, Examiner respectfully notes that claims 6-11 and 17-18 are rejected under double patenting as discussed above and are not currently allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

The prior art, including Tomioka, does not specifically disclose or fairly suggest a system or method for wavelength-shift multiplexing including the limitations, elements, and/or steps specifically recited in claims 6-11 and 17-18 (and including the limitations of the any parent claims on which they depend), particularly further including modulating a photonic input signal with a modulation waveform to shift the photonic signal; comparing a wavelength reference to the resulting shifted photonic signal to provide an error signal; and adjusting the modulation waveform in accordance with the error signal to correct the wavelength of the shifted photonic signal.

Art Unit: 2633

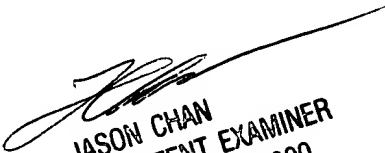
Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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